IN THE CLAIMS

1. (original) A method of determining dough quality comprising:

a) inserting a quantity of dough into a receptacle;

b) propagating an ultrasound signal through the dough;

c) determining ultrasonic velocity and attenuation of the ultrasound signal after passing through the dough; and

d) predicting dough quality based on the ultrasonic velocity and attenuation of the ultrasound signal.

2. (original) The method according to claim 1 wherein the ultrasonic velocity and attenuation of the ultrasound signal are determined by measuring transit time and amplitude of the ultrasound signal after passing through the dough.

3. (original) The method according to claim 1 wherein the dough is a flour dough.

4. (original) The method according to claim 1 wherein the ultrasound signal is a low-level ultrasound signal.

5. (original) The method according to claim 1 wherein the ultrasound signal is an ultrasound signal in the frequency range between 18-100 kHz.

6. (original) The method according to claim 2 wherein the transit time and the amplitude are determined relative to a reference pulse.

7. (original) The method according to claim 1 wherein steps (a) – (c) are repeated for a second quantity of dough differing from the first quantity of dough in at least one variable affecting gas entrainment.

8. (original) The method according to claim 7 wherein the variable affecting gas entrainment is selected from the group consisting of mixing time and headspace pressure during mixing.

9. (original) The method according to claim 7 wherein the variable affecting gas entrainment is selected from the group consisting of bakery improving ingredients such as oxidizing improvers, enzyme improvers and surfactants (emulsifiers).

10. (original) A method of determining dough quality comprising:

a) inserting a quantity of dough into a receptacle;

b) propagating an ultrasound signal through the dough at a first temperature;

c) determining ultrasonic velocity and attenuation of the ultrasound signal after passing through the dough;

d) repeating steps (a) through (c) at at least one other temperature; and

e) predicting dough quality based on the ultrasonic velocity and attenuation of the ultrasound signal versus temperature.

11. (original) The method according to claim 10 wherein the ultrasonic velocity and attenuation of the ultrasound signal are determined by measuring transit time and amplitude of the ultrasound signal after passing through the dough.

12. (original) The method according to claim 10 wherein the dough is a flour dough.

13. (original) The method according to claim 10 wherein the ultrasound signal is a low-level ultrasound signal.

14. (original) The method according to claim 10 wherein the ultrasound signal is an ultrasound signal in the frequency range between 18-100 kHz.

15. (original) A method of determining dough quality comprising:

a) inserting a first quantity of dough into a first receptacle such that said first quantity of dough has a first thickness;

b) propagating an ultrasound signal through the first dough;

c) determining transit time and amplitude of the ultrasound signal after passing through the first dough;

d) inserting a second quantity of dough into a second receptacle such that said second quantity of dough has a second thickness;

e) propagating an ultrasound signal through the second dough;

f) determining transit time and amplitude of the ultrasound signal after passing through the second dough; and

g) predicting dough quality based on the ultrasonic velocity and attenuation of the ultrasound signal from the thickness dependence of the transit time and amplitude.

16. (original) The method according to claim 15 wherein three or more samples of different thickness are analyzed.

17(original). The method according to claim 15 wherein the dough is a flour dough.

18. (original) The method according to claim 15 wherein the ultrasound signal is a low-level ultrasound signal.

19. (original) The method according to claim 15 wherein the ultrasound signal is an ultrasound signal in the frequency range between 18-100 kHz.

20. (original) A method of analyzing fermentation response in a quantity of dough comprising:

(a) inserting a quantity of dough into a receptacle having a given thickness;

(b) propagating an ultrasound signal through the dough at a first time;

(c) determining ultrasonic velocity and attenuation of the ultrasound signal after passing through the dough at said first time;

(d) propagating an ultrasound signal through the dough at a second time;

(e) determining ultrasonic velocity and attenuation of the ultrasound signal after passing through the dough at said second time; and

(f) determining fermentation response of the dough based on the change in ultrasonic velocity and attenuation over time.

21. (original) The method according to claim 20 wherein the ultrasonic velocity and attenuation of the ultrasound signal are determined by measuring transit time and amplitude of the ultrasound signal after passing through the dough.

22. (original) The method according to claim 20 wherein the dough is a flour dough.

23. (original) The method according to claim 20 wherein the ultrasound signal is a low-level ultrasound signal.

24. (original) The method according to claim 20 wherein the ultrasound signal is an ultrasound signal in the frequency range between 18-100 kHz.

25. (original) A method of determining dough quality comprising:

(a) inserting a quantity of dough into a receptacle such that the dough has a

given thickness, said receptacle being in a chamber in which pressure can be varied;

(b) propagating an ultrasound signal through the dough at a first pressure;

(c) determining ultrasonic velocity and attenuation of the ultrasound signal after passing through the dough at said first pressure;

(d) propagating an ultrasound signal through the dough at a second pressure;

(e) determining ultrasonic velocity and attenuation of the ultrasound signal after passing through the dough at said second pressure; and

(f) predicting dough quality based on the change in ultrasonic velocity and attenuation versus pressure.

26. (original) The method according to claim 25 wherein the ultrasonic velocity and attenuation of the ultrasound signal are determined by measuring transit time and amplitude of the ultrasound signal after passing through the dough.

27. (original) The method according to claim 25 wherein the dough is a flour dough.

28. (original) The method according to claim 25 wherein the ultrasound signal is a low-level ultrasound signal.

29. (original) The method according to claim 25 wherein the ultrasound signal is an ultrasound signal in the frequency range between 18-100 kHz.

30. (original) The method according to claim 26 wherein the hysteresis in transit time and amplitude, or velocity and attenuation, on decreasing and increasing pressure cycles is analyzed.

31. (original) The method according to claim 26 wherein the transit time and the amplitude are measured continuously after a rapid change in pressure, thereby determining the rate of change of dough response to a quasi-instantaneous change in pressure.

32. (currently amended) The method according to ~~any one of~~ claims ~~2, 11, 21 or 26~~ wherein the transit time and amplitude of the ultrasonic signal, after passing through a given thickness of dough, are used directly to monitor dough quality.

33. (original) A method of determining dough quality comprising:

(a) inserting a quantity of dough into a receptacle having a given thickness,

said receptacle being in a chamber in which pressure can be varied;

(b) measuring the cross sectional area of the dough at a first pressure;

(c) measuring the cross sectional area of the dough at a second pressure;

(d) determining the true strain from the change in cross sectional area of the dough while maintaining a constant thickness constant;

(e) determining the applied stress from the difference between the second and first pressure; and

(f) predicting dough quality based on the true strain versus stress.

34. (original) The method according to claim 33 wherein the pressure is varied over more than two values.

Respectfully submitted

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